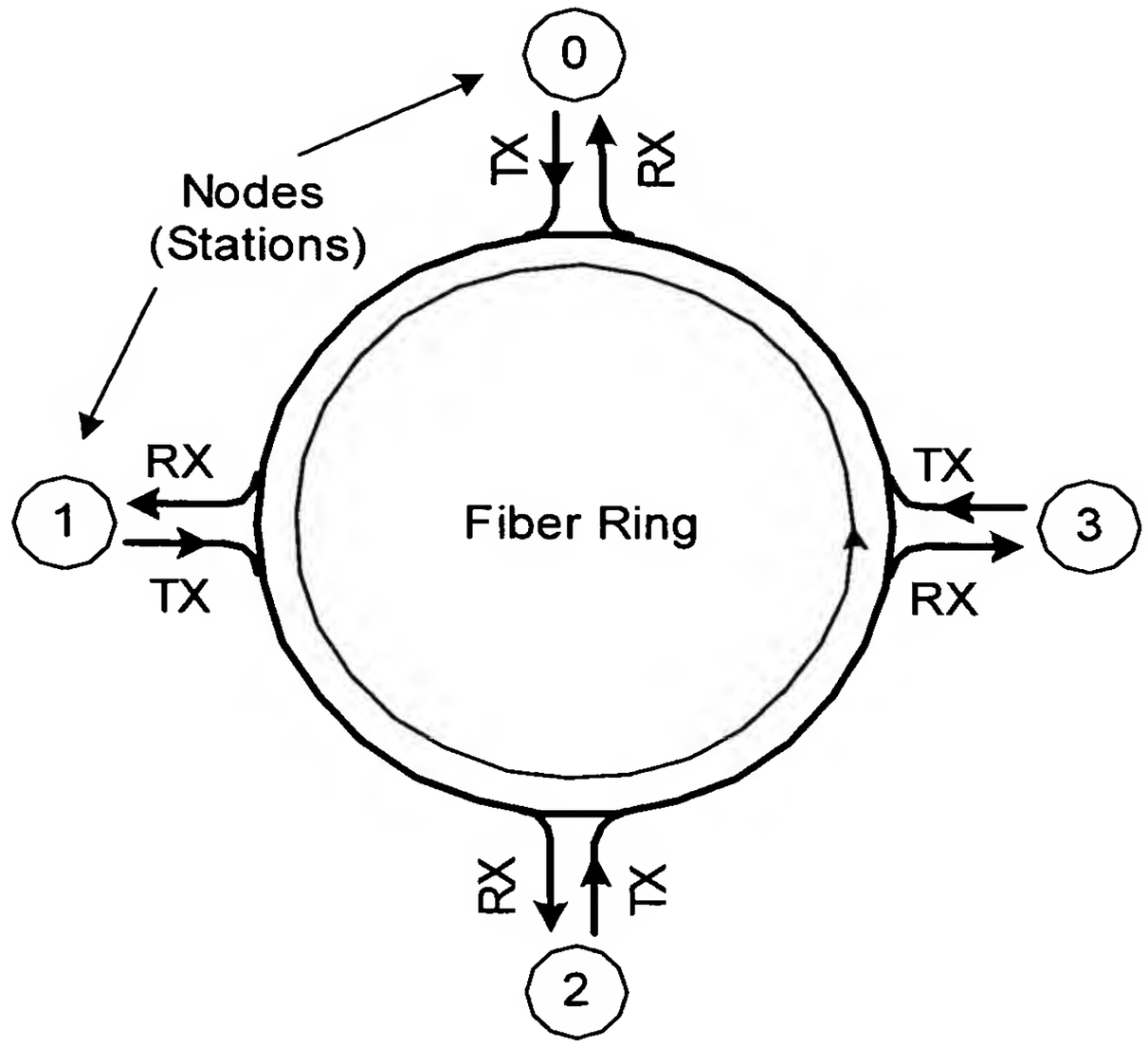

0
TX
RX
Nodes
(Stations)
RX
1
TX
Fiber Ring
TX
3
RX
RX
TX
2

FIG.1A

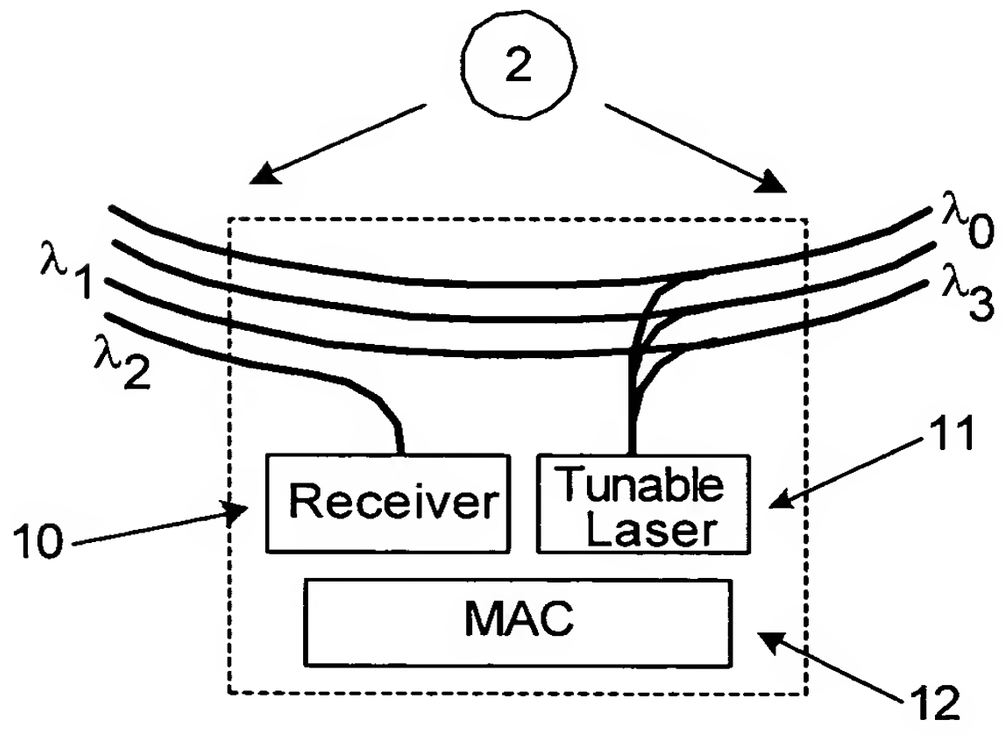

2
λ_0
λ_1
λ_3
λ_2
11
Receiver
Tunable
Laser
10
MAC
12

FIG.1B

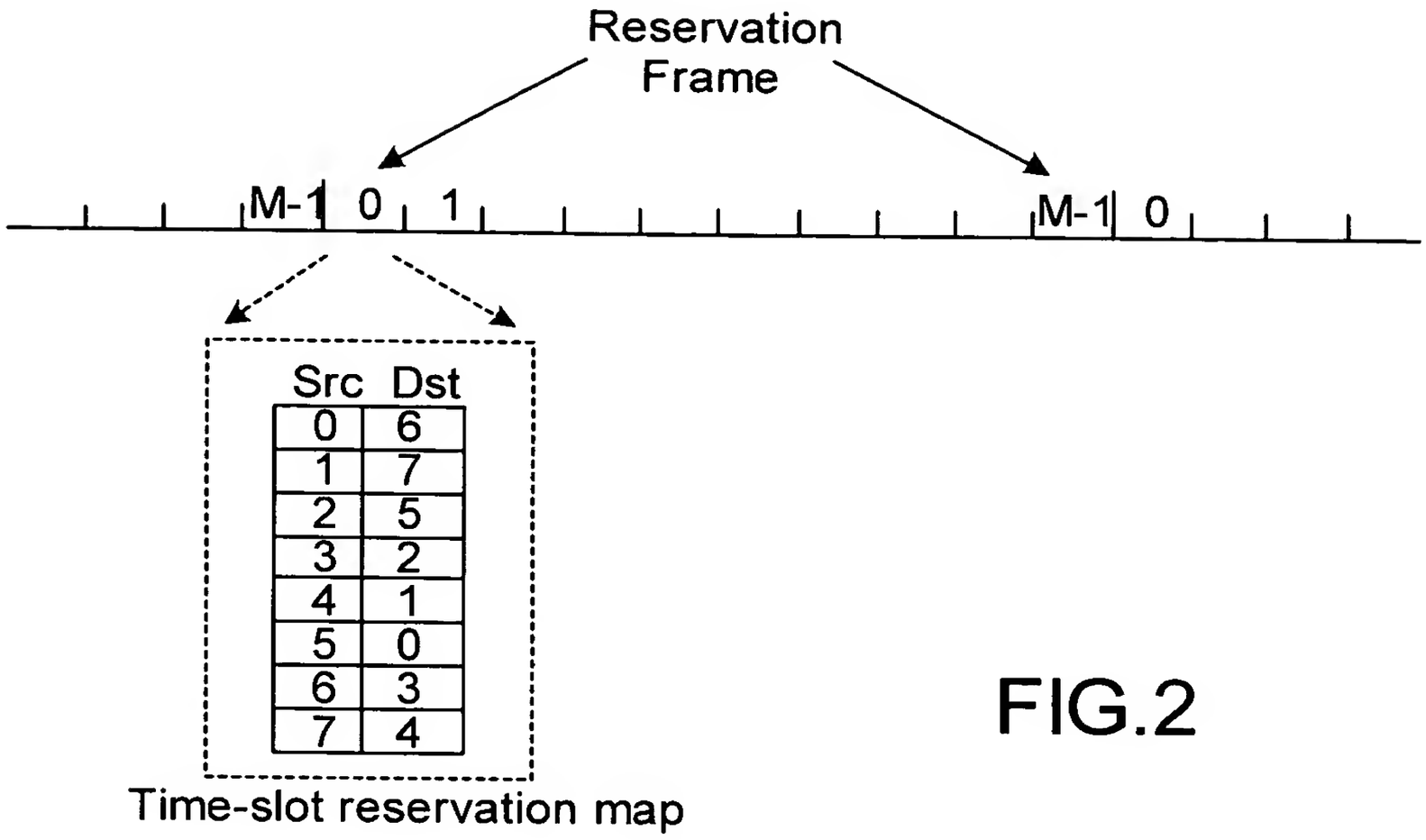
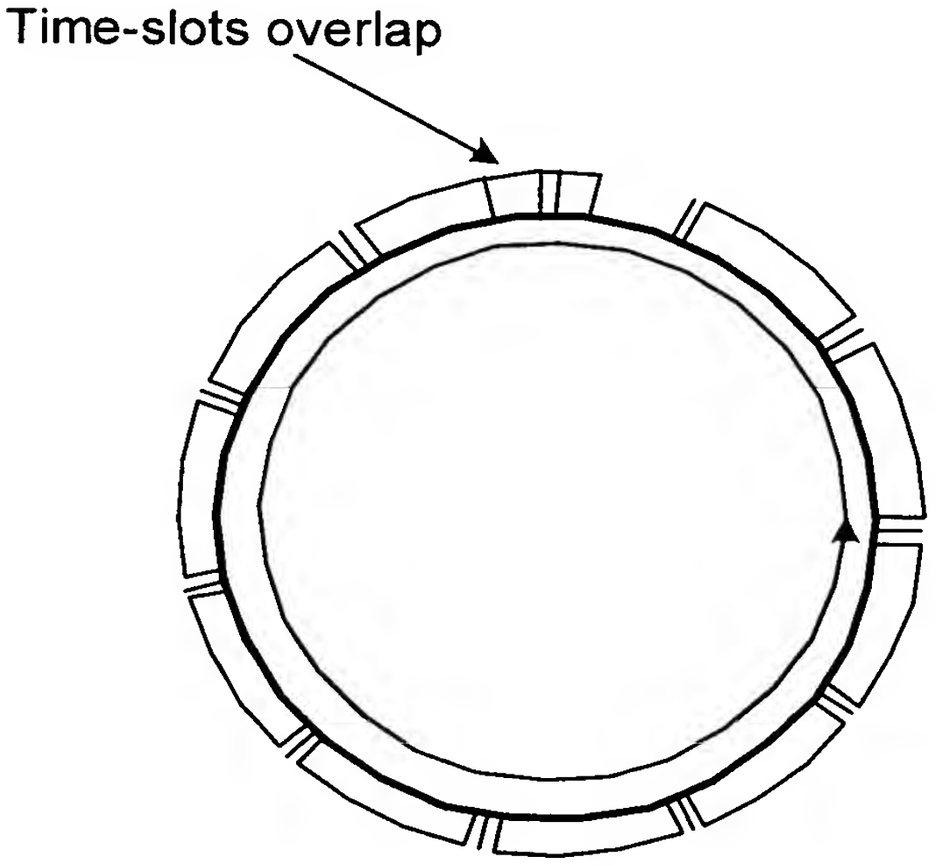

Reservation
Frame
M-1
0
1
M-1
0
Src Dst
0 6
1 7
2 5
3 2
4 1
5 0
6 3
7 4
Time-slot reservation map

FIG.2

FIG.3


Time-slots overlap

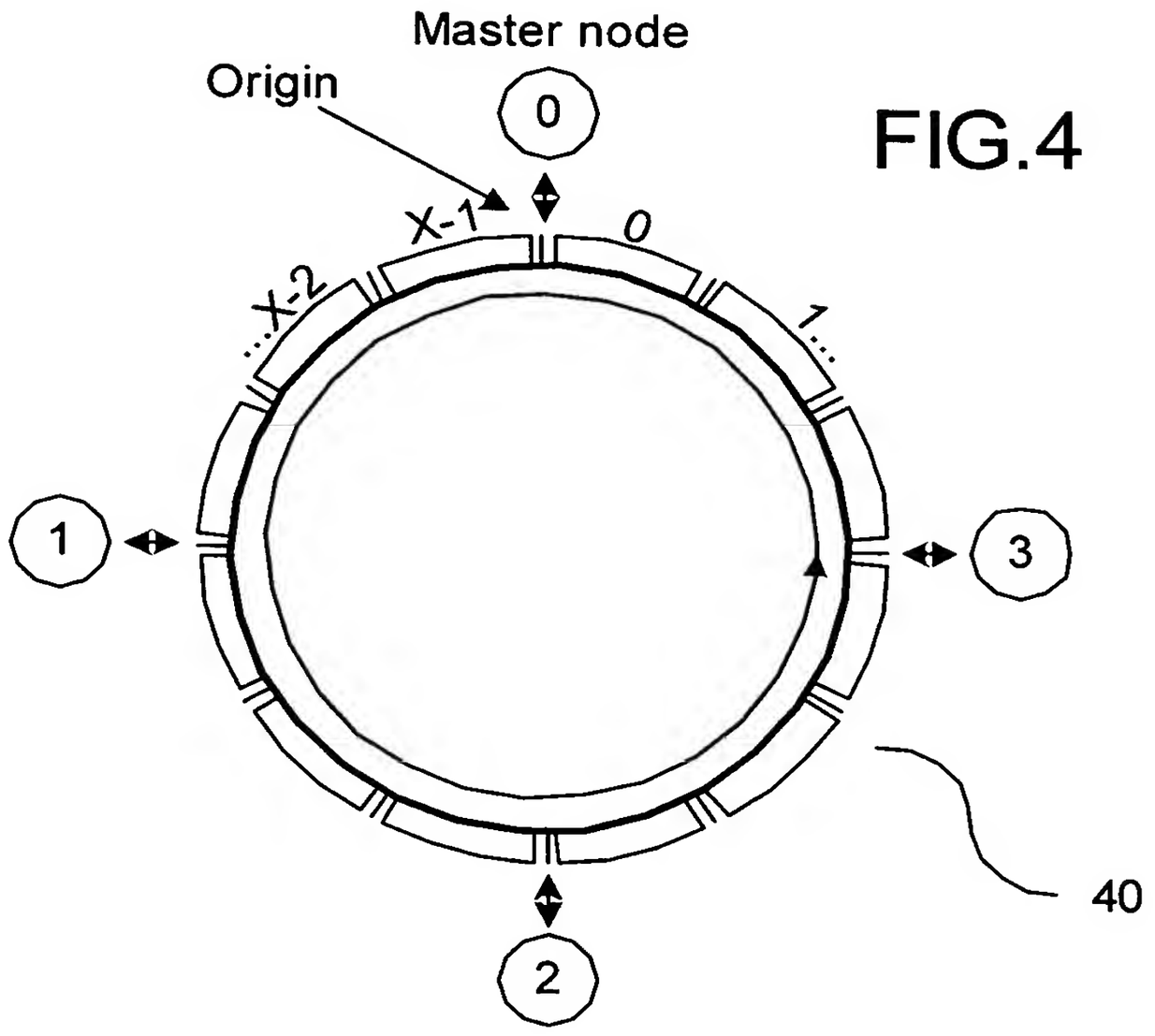


FIG.4

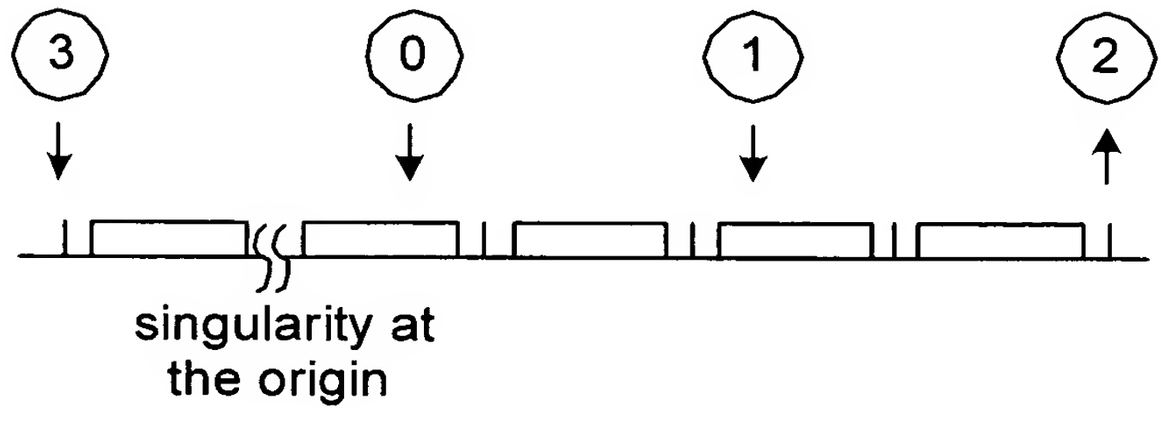


FIG.5

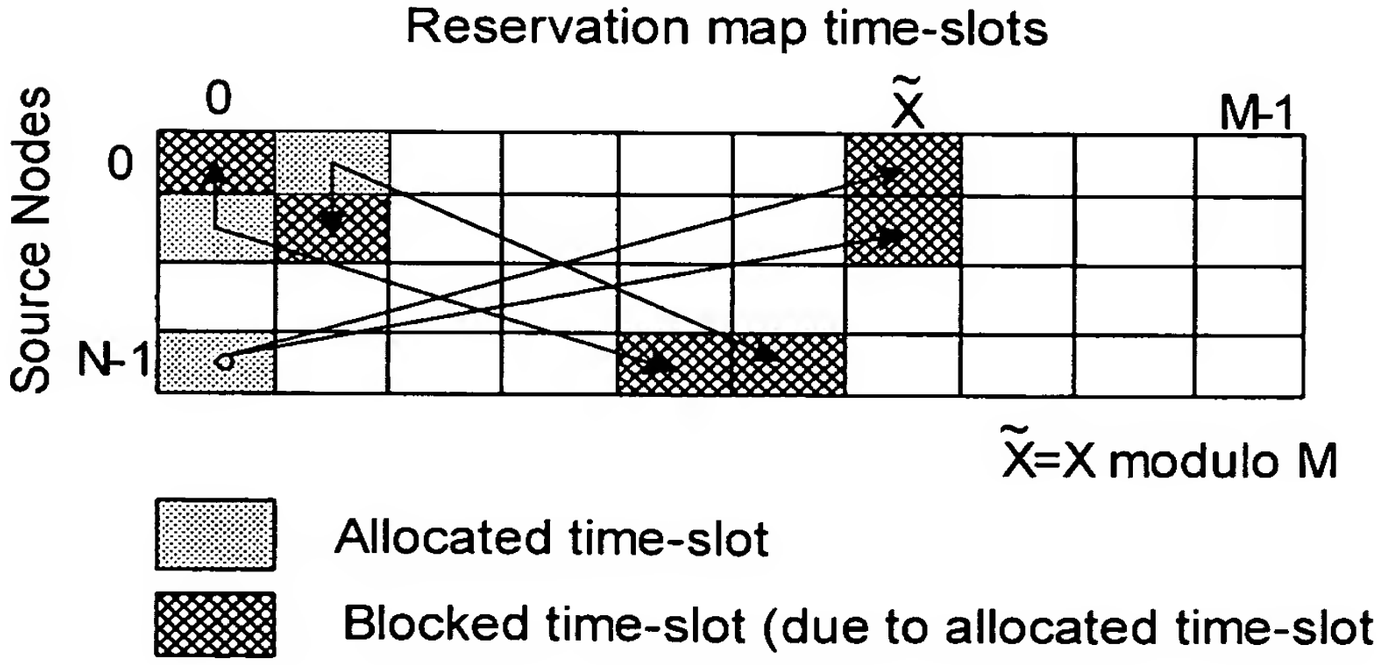


FIG.6

FIG.7

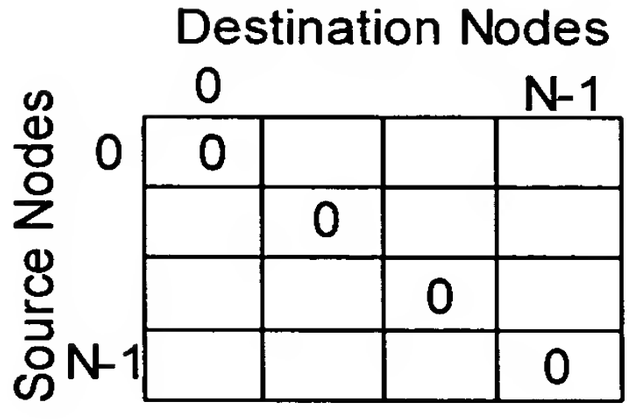

Destination Nodes
0
N-1
Source Nodes
0
N-1
0
0
0
0

FIG.8

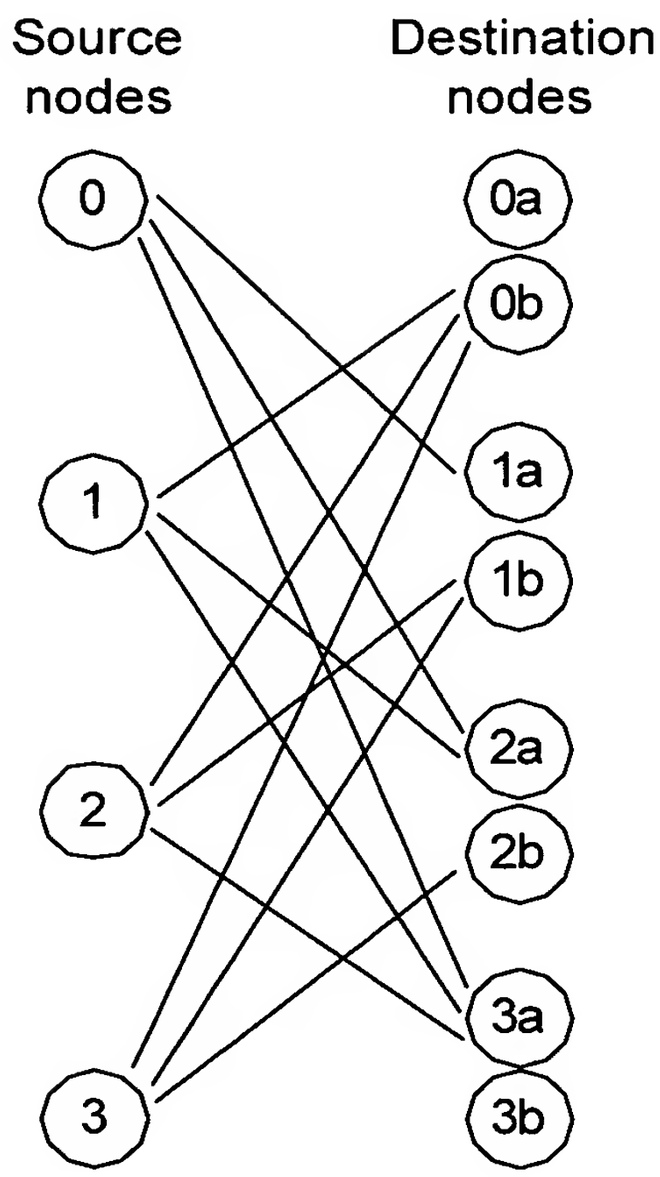

Source nodes
Destination nodes
0
1
2
3
0a
0b
1a
1b
2a
2b
3a
3b

FIG.9

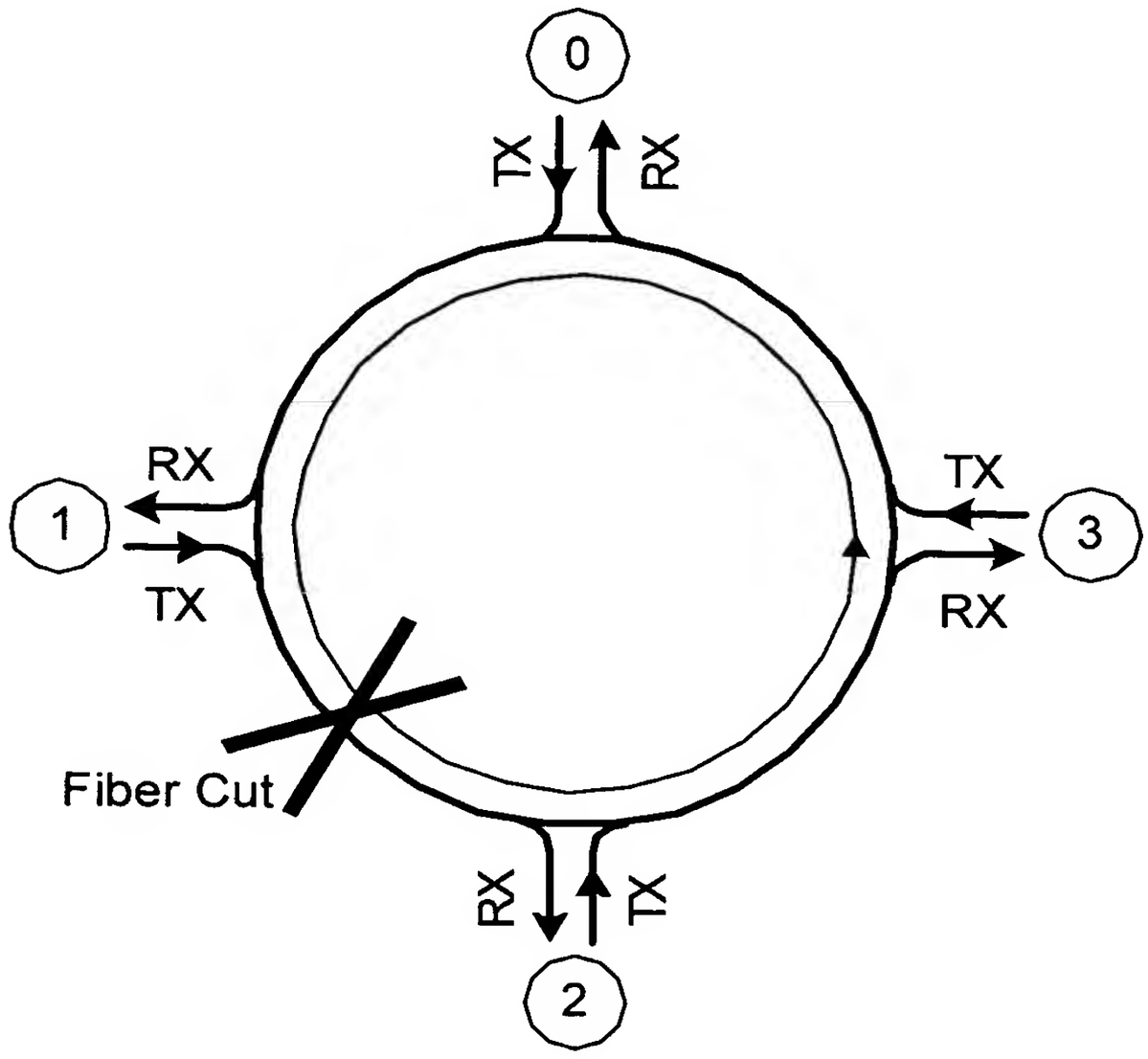

0
TX
RX
RX
1
TX
TX
3
RX
Fiber Cut
RX
TX
2

FIG.10

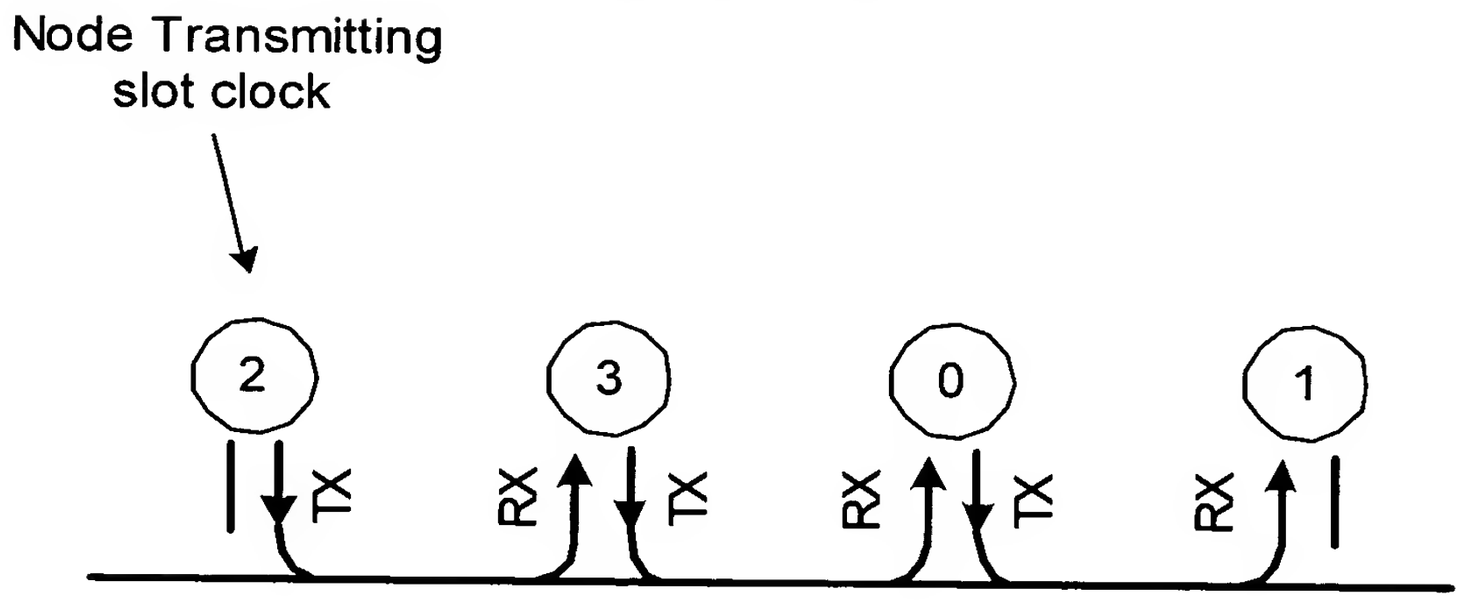

Node Transmitting
slot clock
2
3
0
1
TX
RX
TX
RX
TX
RX

FIG.11

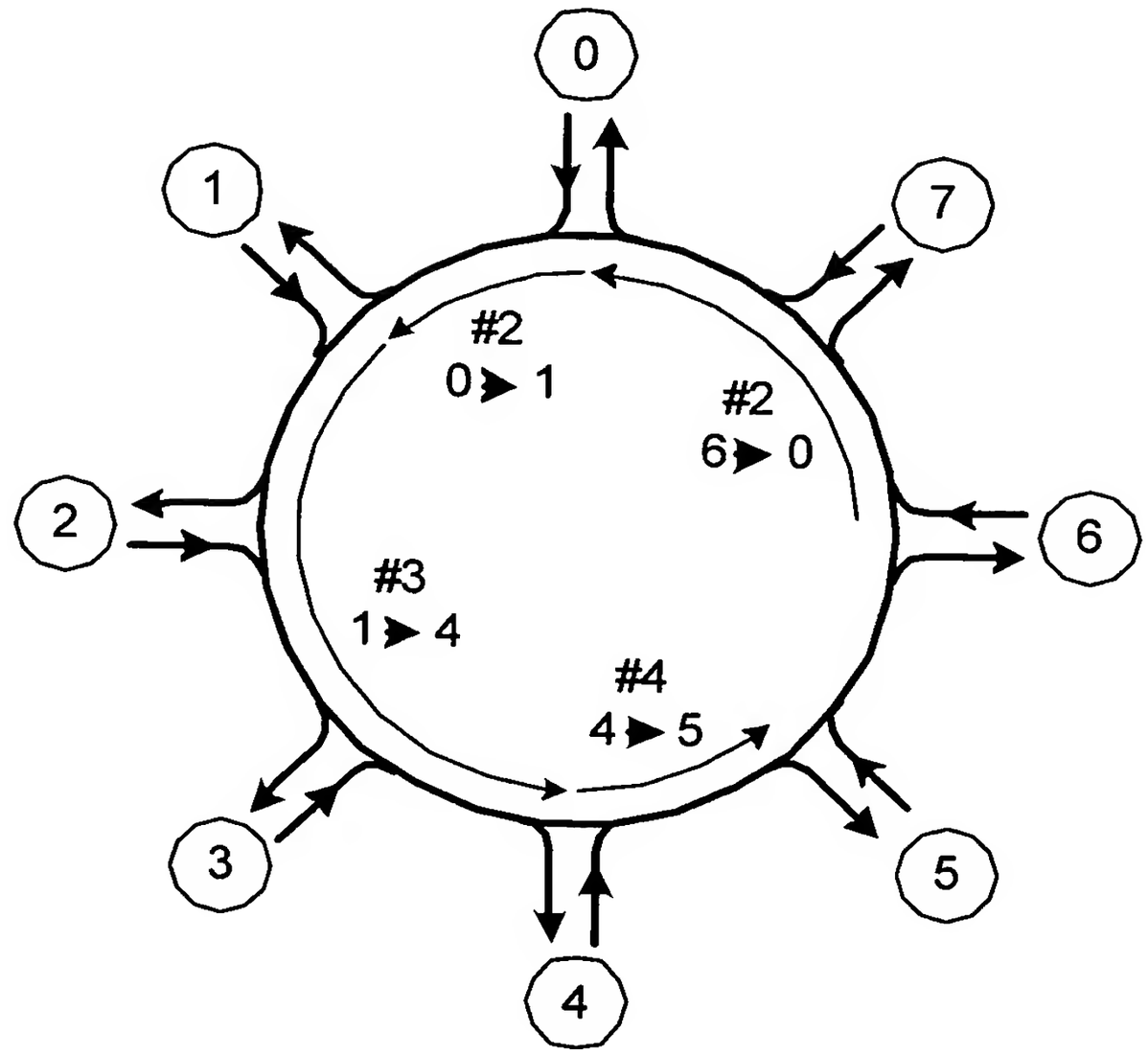


FIG.12

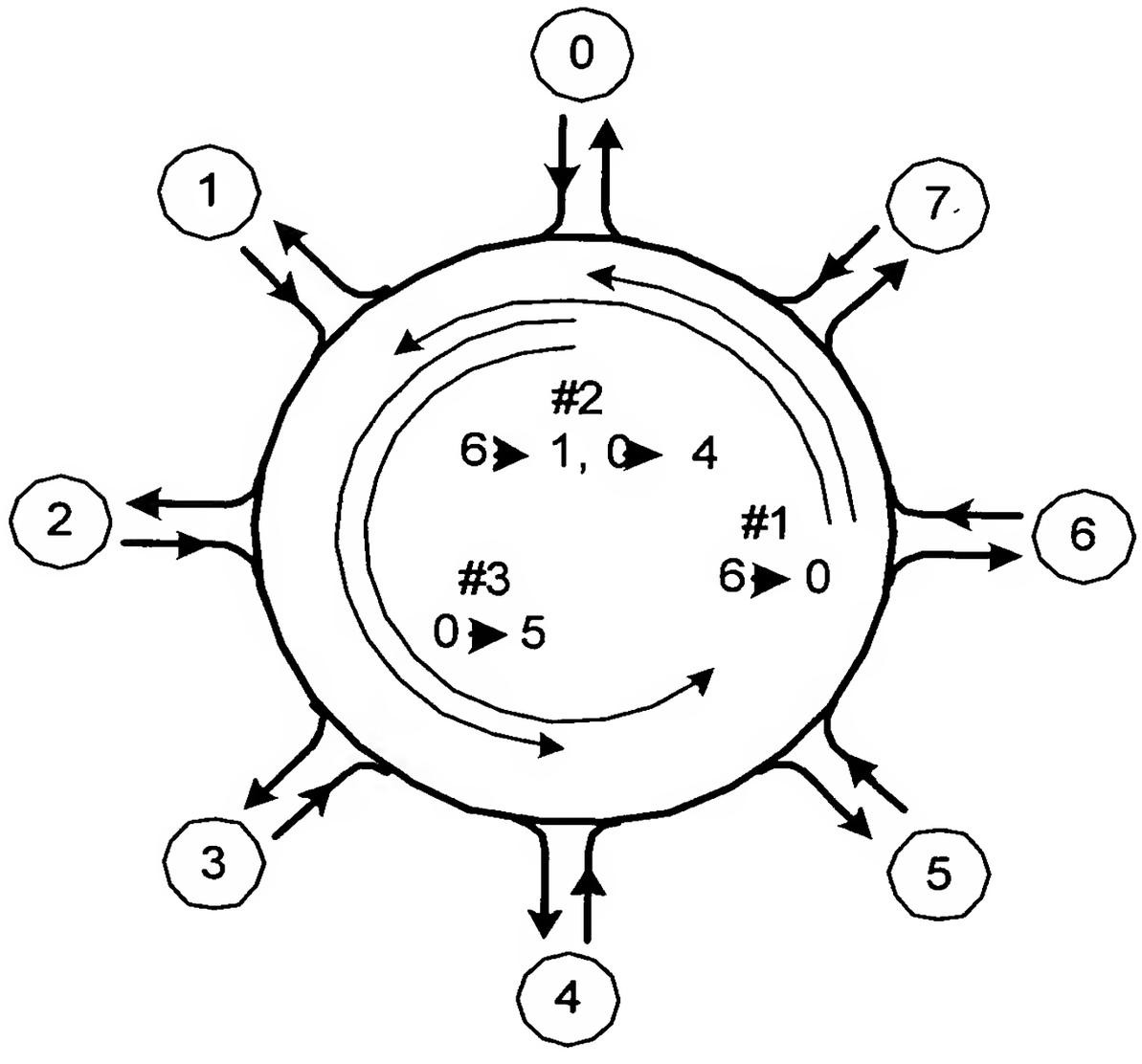


FIG.13

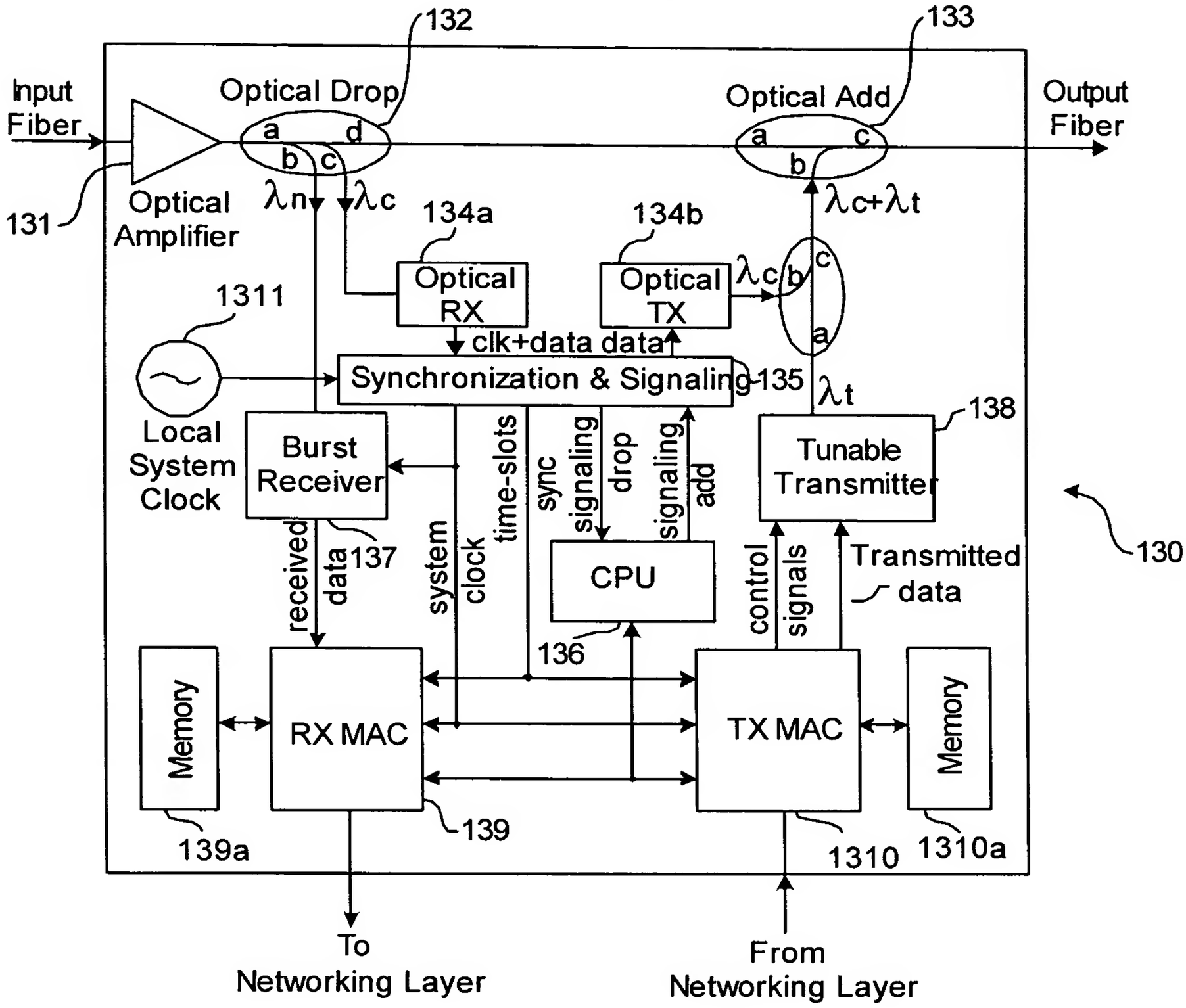

132
133
Input Fiber
Optical Drop
Optical Add
Output Fiber
a
d
b
c
a
c
b
131
Optical Amplifier
λn
λc
λc+λt
134a
134b
Optical RX
Optical TX
λc
b
c
a
1311
clk+data
data
Synchronization & Signaling
135
λt
138
Local System Clock
Burst Receiver
time-slots
sync signaling
drop
signaling
add
Tunable Transmitter
130
received data
137
system clock
CPU
control signals
Transmitted data
136
Memory
RX MAC
TX MAC
Memory
139a
139
1310
1310a
To Networking Layer
From Networking Layer

FIG.14

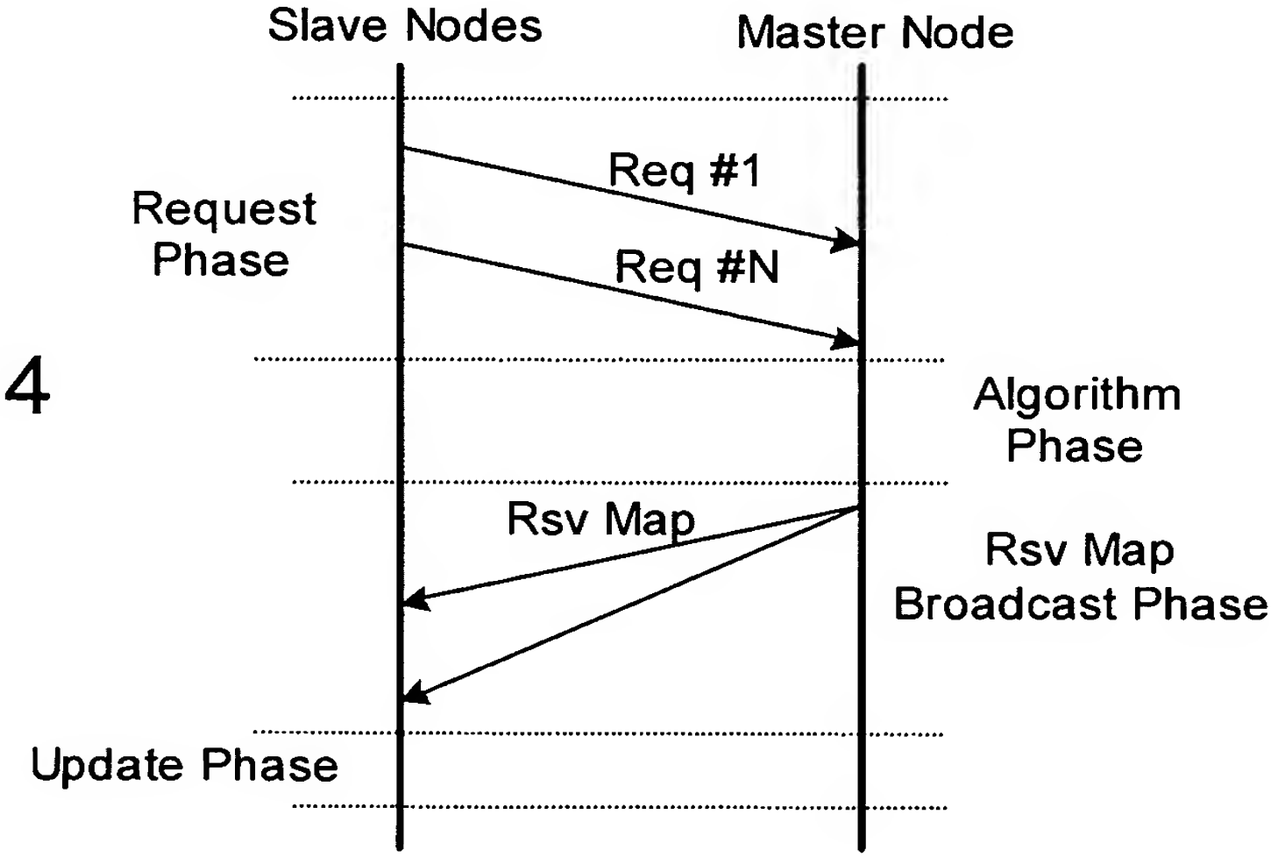

Slave Nodes
Master Node
Request Phase
Req #1
Req #N
Algorithm Phase
Rsv Map
Rsv Map Broadcast Phase
Update Phase

FIG.15

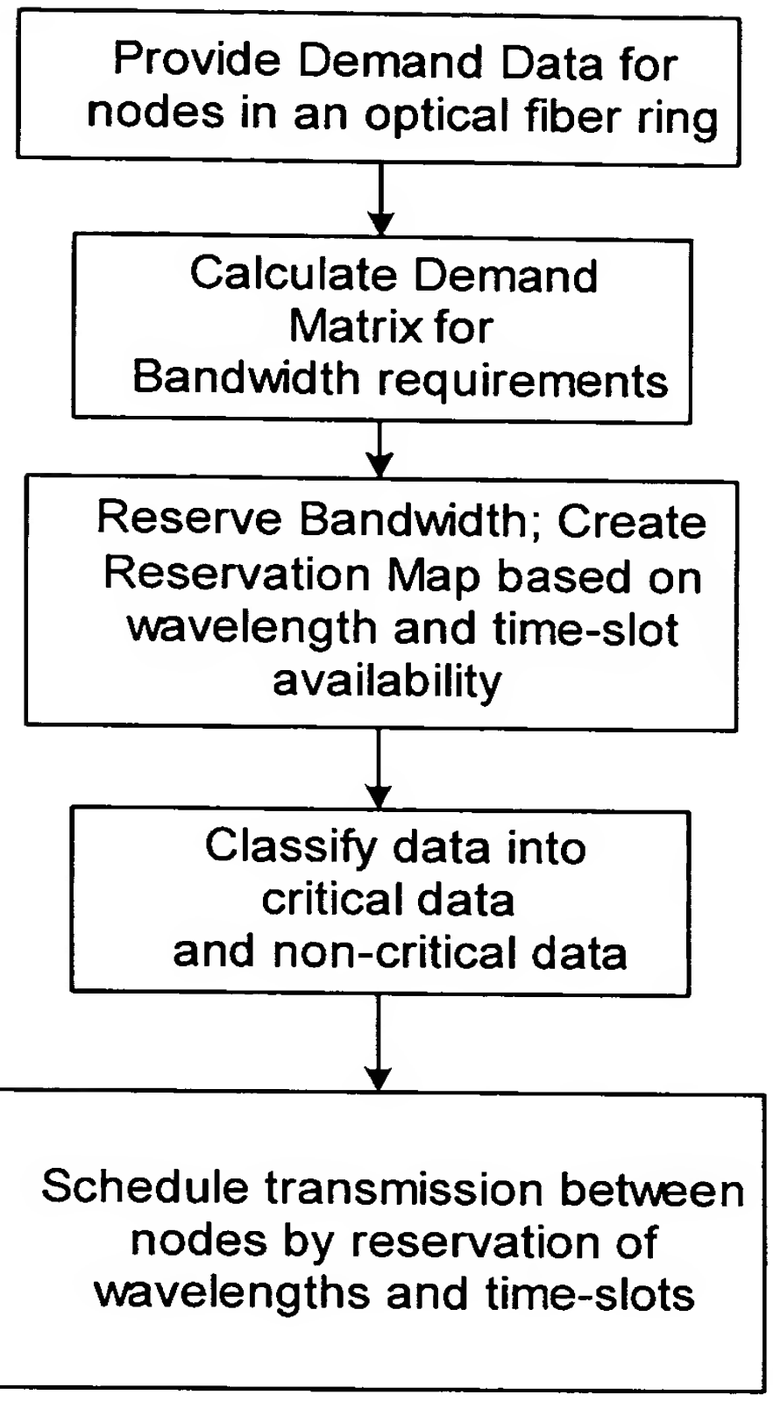
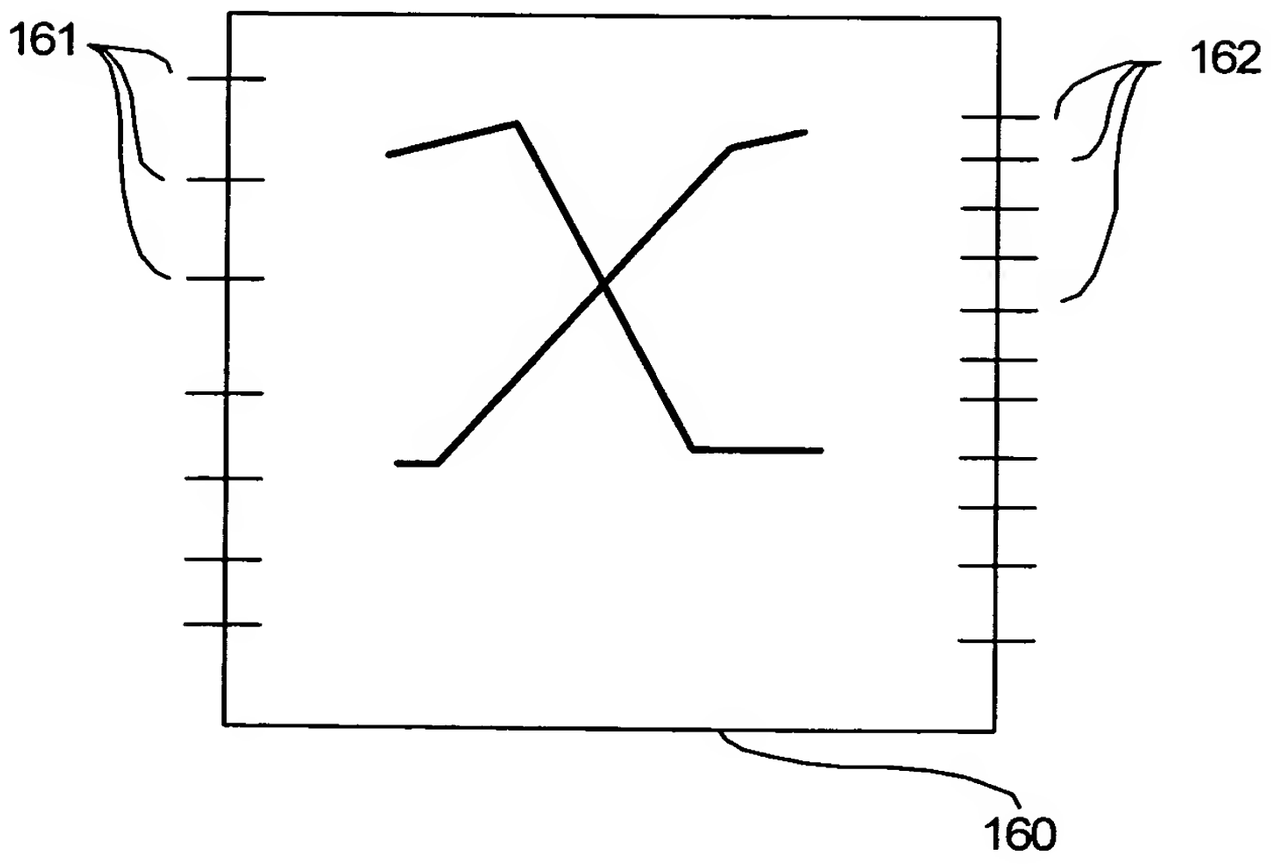

Provide Demand Data for nodes in an optical fiber ring
Calculate Demand Matrix for Bandwidth requirements
Reserve Bandwidth; Create Reservation Map based on wavelength and time-slot availability
Classify data into critical data and non-critical data
Schedule transmission between nodes by reservation of wavelengths and time-slots

FIG.16


161
162
160

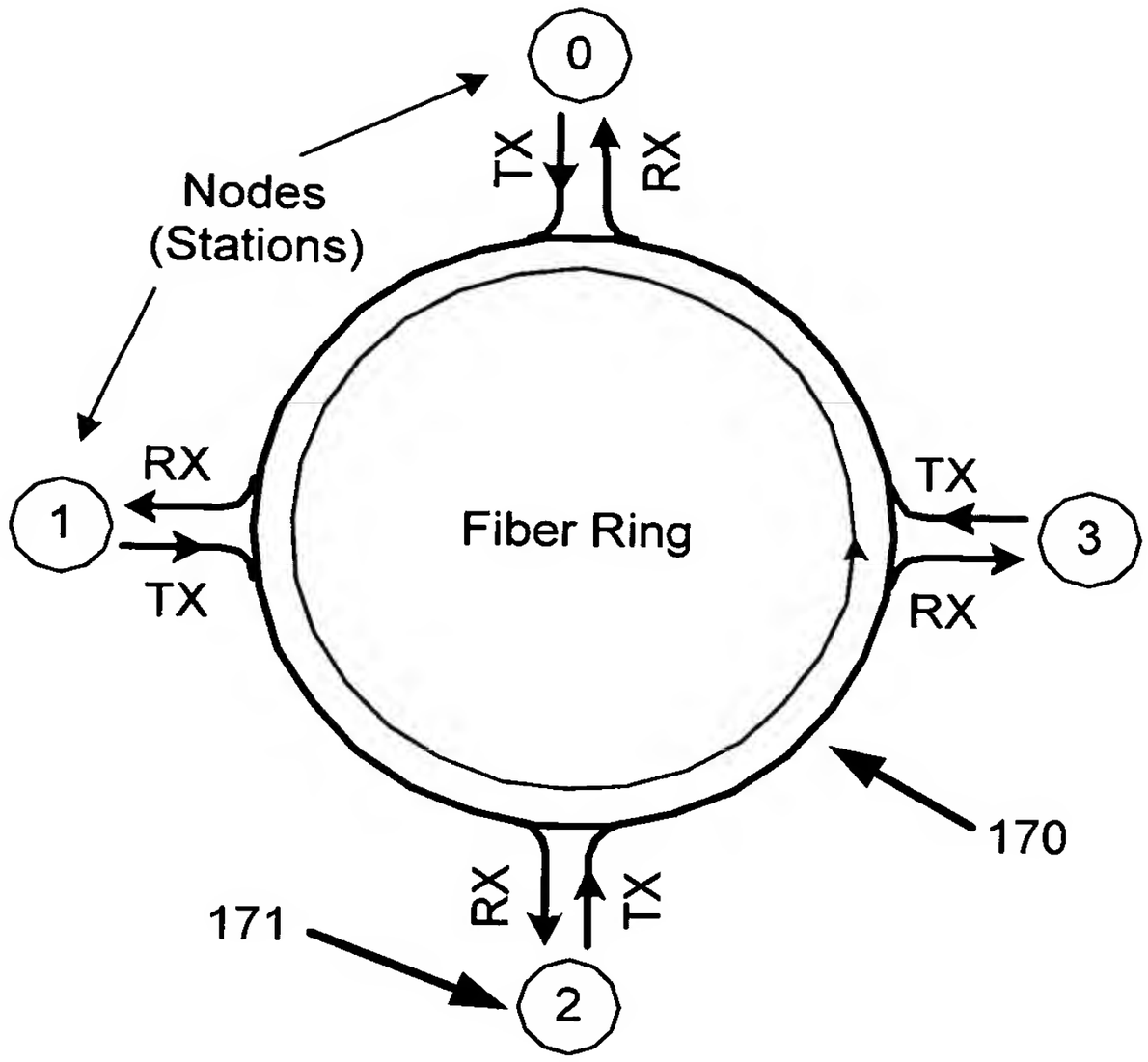


FIG.17A

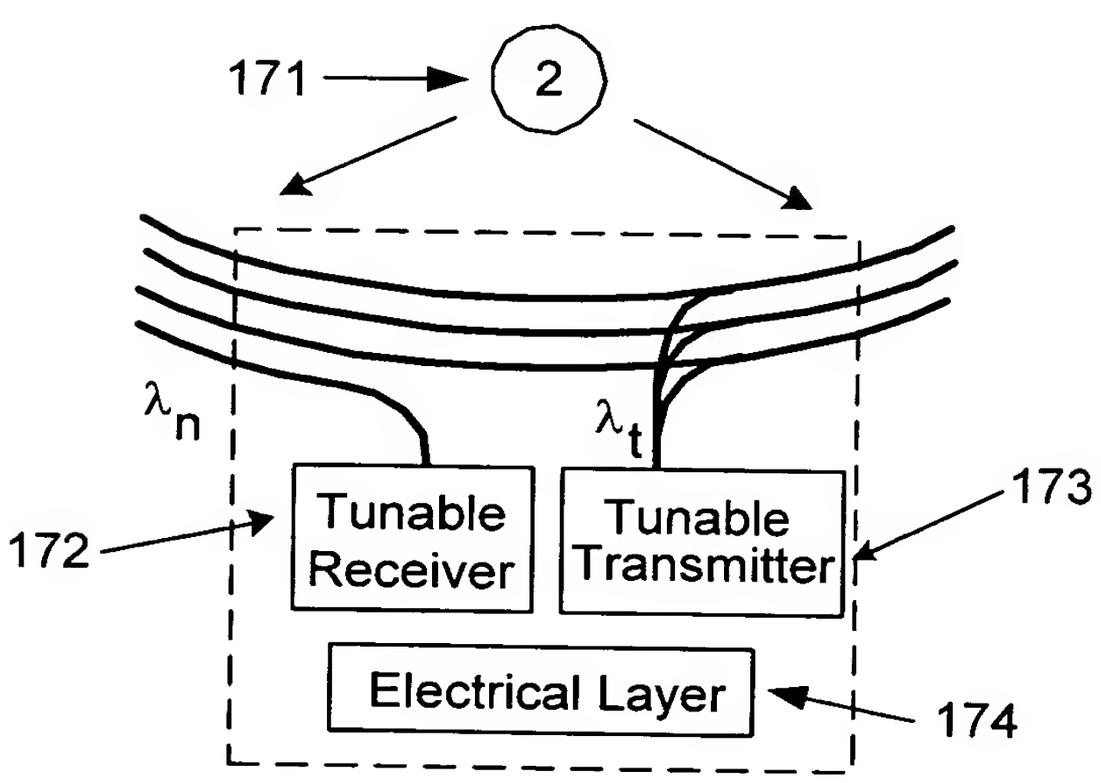


FIG.17B

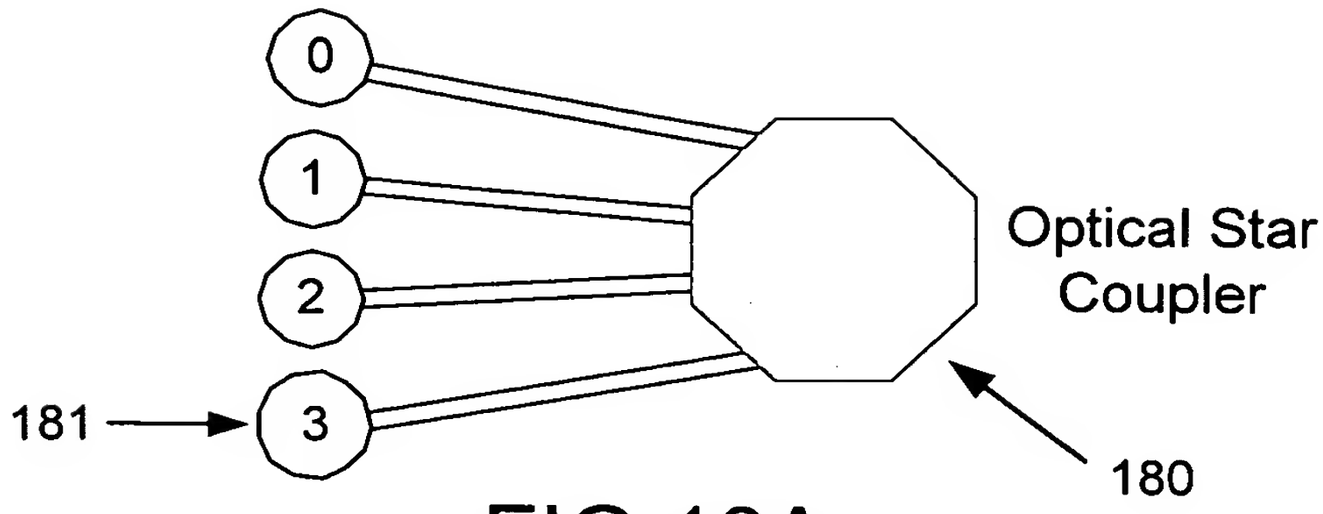


FIG.18A

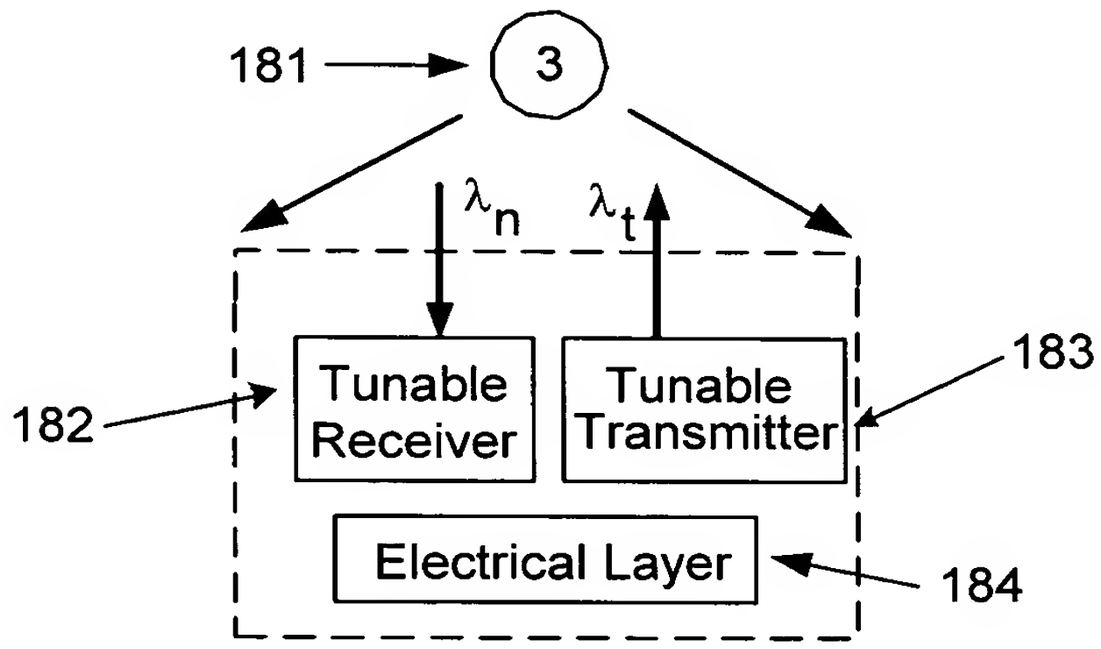


FIG.18B

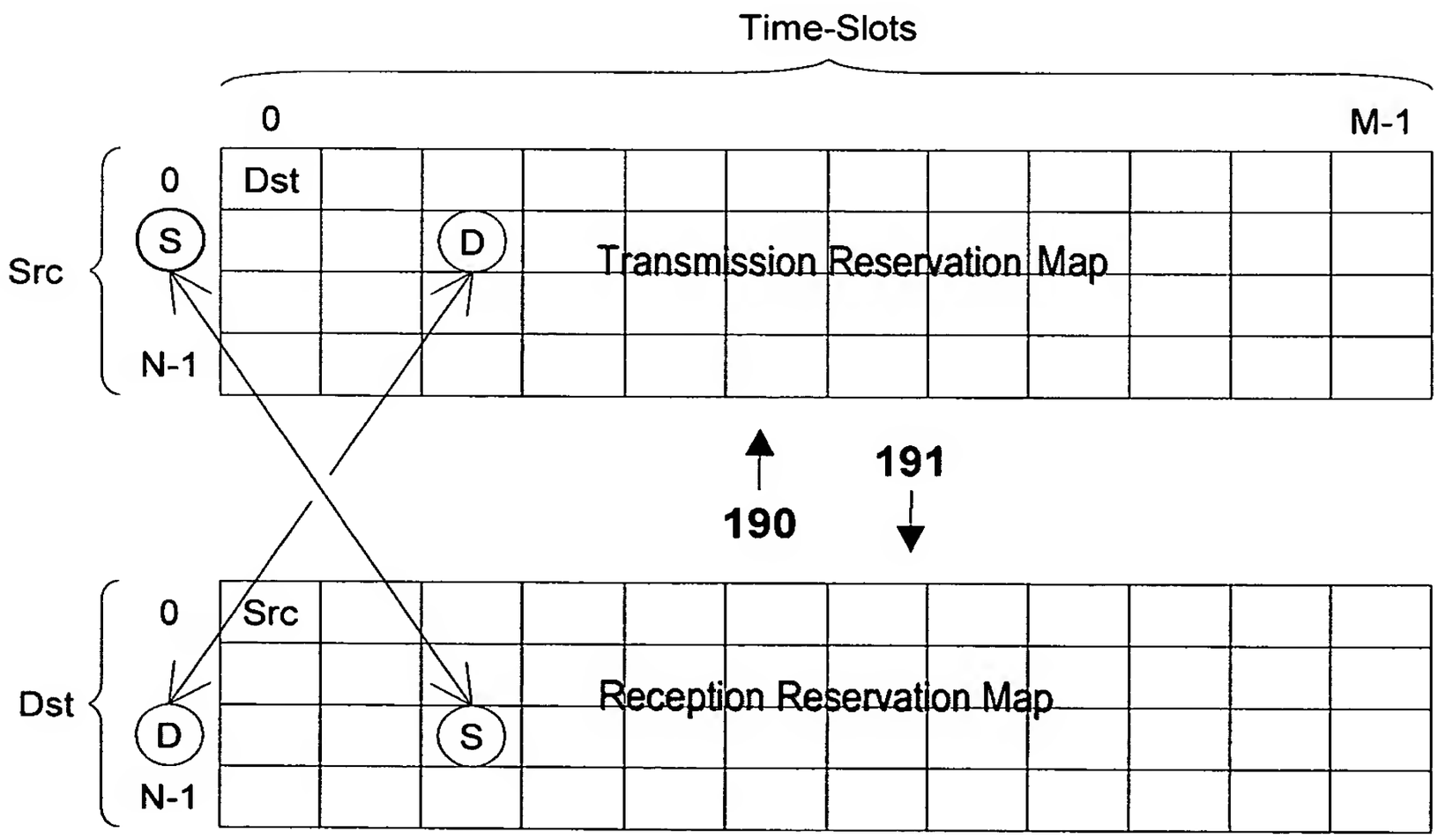


FIG.19

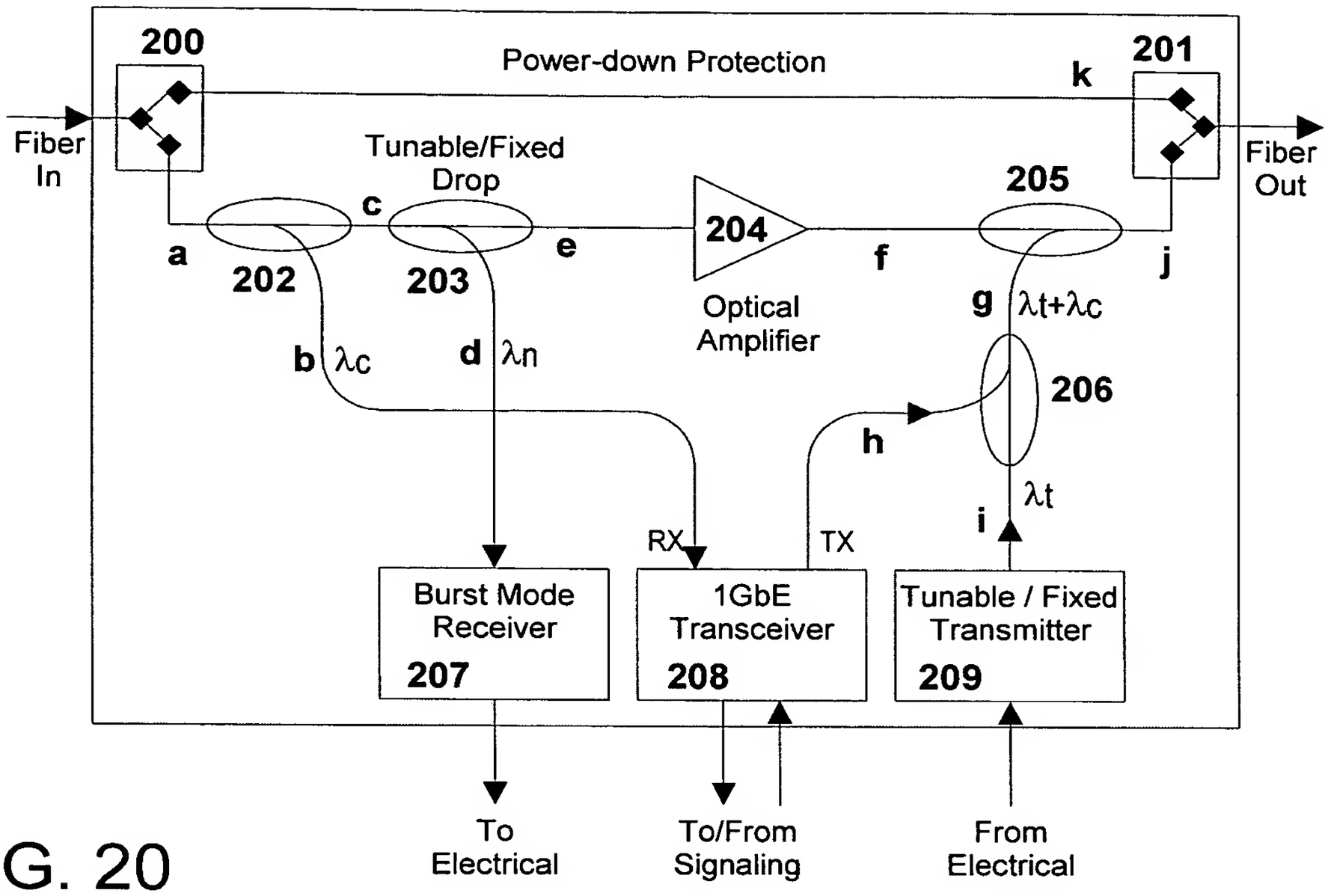

200
Power-down Protection
201
k
Fiber In
Tunable/Fixed Drop
205
Fiber Out
c
204
a
e
f
j
202
203
Optical Amplifier
g
λt+λc
b
λc
d
λn
206
h
λt
i
RX
TX
Burst Mode Receiver
207
1GbE Transceiver
208
Tunable / Fixed Transmitter
209
To Electrical
To/From Signaling
From Electrical

FIG. 20

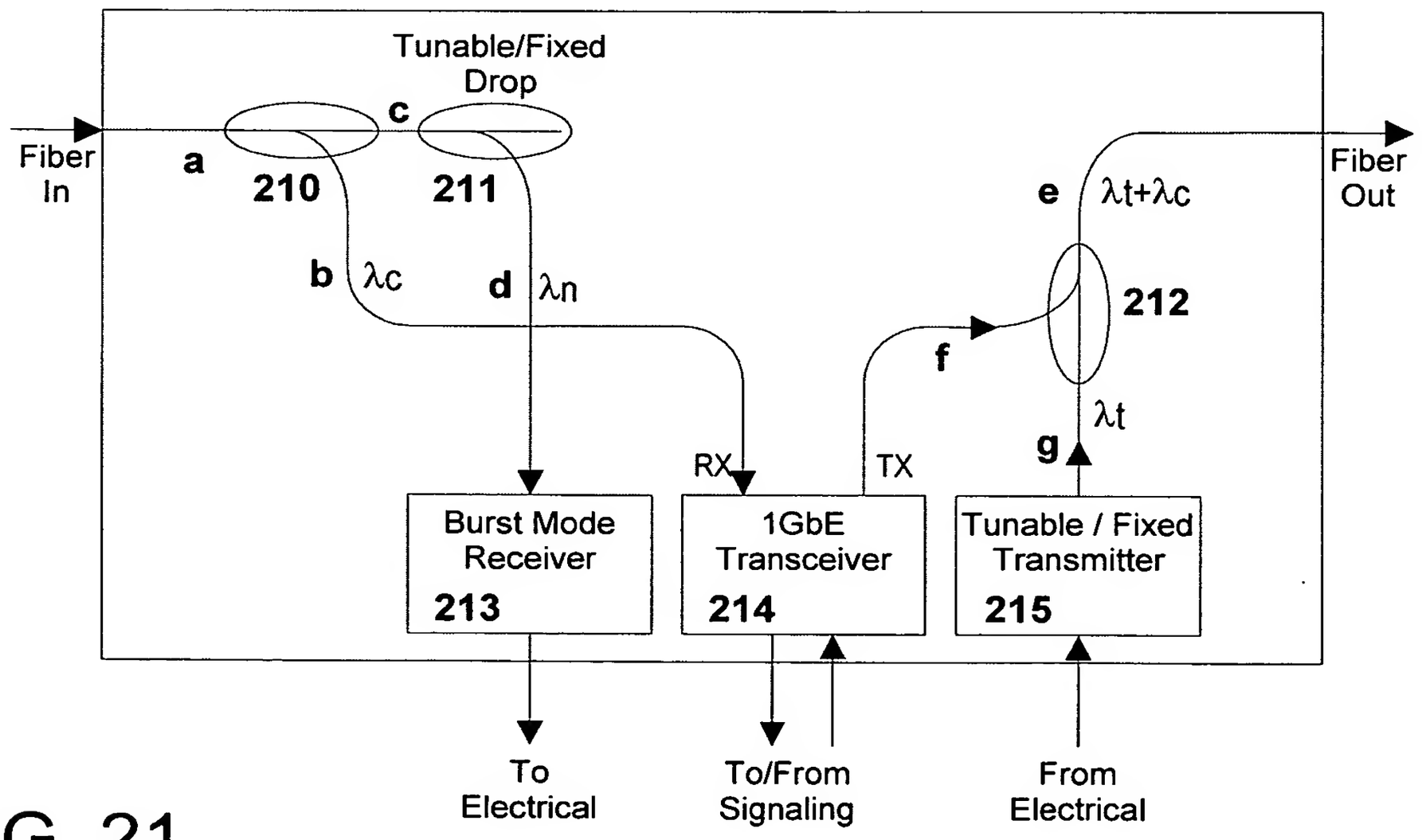

Tunable/Fixed Drop
c
Fiber In
a
210
211
Fiber Out
e
λt+λc
b
λc
d
λn
212
f
λt
g
RX
TX
Burst Mode Receiver
213
1GbE Transceiver
214
Tunable / Fixed Transmitter
215
To Electrical
To/From Signaling
From Electrical

FIG. 21